Claims:

1. A process for preparing microspheres comprising an ionically crosslinked polymer, the process comprising:
(a) producing liquid aerosol droplets (13) from a solution (3) comprising an ionically crosslinkable polyionic polymer into a continuous gas stream by using an ultrasonic nebulizer;
(b) transferring the gas stream into a gelling solution (10) comprising di-, multi- or polyvalent ions, whereby crosslinked polymer microspheres (14) are formed,
(c) separating the microspheres from the gelling solution, and
(d) optionally, filtering the microspheres through a screen.

2. The process according to claim 1, wherein the ionically crosslinkable polymer is a polyanionic polymer and wherein the gelling solution comprises a polyvalent cation.

3. The process according to claim 2, wherein the polyvalent cation of the gelling solution is selected from the group consisting of poly (allylamine hydrochloride), poly(ethylene imine), poly(diallyldimethylammonium chloride), polyamide-polyamine-epichlorhydrine, chitosan, amino-dextran, and protamine sulfate.

4. The process according to claim 1, wherein the ionically crosslinkable polymer is a polyanionic polymer and wherein the gelling solution comprises di-, multi- or polyvalent cations.

5. The process according to claim 4, wherein the polyanionic polymer is selected from the group consisting of anionic polysaccharides, a linear or branched polyacrylic acid, and polystyrene sulfonate.

6. The process according to claim 5, wherein the anionic polysaccharide is selected from the group consisting of an alginic acid, a carrageenan, a cellulose sulphate, a dextran sulphate, a gellan, a pectin and water soluble salts thereof.

7. The process according to claim 6, wherein the anionic polysaccharide is an alginic acid or a water soluble salt thereof.

8. The process according to any one of claims 4 to 7, wherein, in step (a), the polyanionic polymer is present in a concentration of from 0.1 % to 5.0 % by weight.

9. The process according to any one of claims 4 to 8, wherein the ion of the gelling solution is a metal cation selected from the group consisting of Pb^{2+}, Cu^{2+}, Ba^{2+}, Sr^{2+}, Cd^{2+}, Ca^{2+}, Zn^{2+}, Co^{2+}, and Ni^{2+}.

10. The process according to claim 9, wherein the metal cation of the gelling solution is selected from the group consisting of Ba^{2+}, Sr^{2+}, and Ca^{2+}.

11. The process according to claim 10, wherein the metal cation of the gelling solution is Ca^{2+}.

12. The process according to any one of claims 1 to 11, wherein the gelling solution additionally comprises up to 1 % by weight of a surfactant.

13. The process according to claim 12, wherein the surfactant is present in an amount of from 0.02 to 1.0 % by weight, preferably of from 0.05 to 0.15 % by weight.

14. The process according to claim 12 or 13, wherein the surfactant is selected from the group consisting of polyoxyethylene-sorbitans and surfactants comprising a block copolymer of ethylene oxide and/or propylene oxide.

15. The process according to any one of the claims 1 to 14, wherein the temperature of the solution of the ionically crosslinkable polyionic polymer according to step (a) is kept within a temperature of from 15 to 50 °C, preferably within 25 to 35 °C.

16. The process according to claim 4, wherein, in step (a), the solution comprises of from 0.75 % to 1.5 % by weight low viscosity sodium alginate, wherein the cation is Ca^{2+}; and wherein the gelling solution comprises of from 0.05 % to 0.15 % by weight of poly(oxyethylene)20-sorbitane monolaureate.

17. A system for preparing microspheres comprising an ionically crosslinked polymer, the system comprising

(a) an ultra sound generator (1) situated in a nebulizing chamber (2) which is filled with a solution (3) comprising an ionically crosslinkable polymer;

(b) a radiator coil (4) attached to the nebulizing chamber;

(c) optionally, means (6) for keeping the gas-fluid level (5) in the nebulizing chamber (2) at a predetermined constant level;

(d) a gas inlet (7) attached to the nebulizing chamber (2)

(e) a vessel for the gelling solution (9), equipped with agitation means (11); and

(f) a transfer tubing (8) attached to the nebulizing chamber, connecting nebulizing chamber and vessel, wherein the tubing is adapted to submerge into the gelling solution (10).